



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,284	12/03/2003	J. Scott Price	GEMS 0136 PUS	1283
27256	7590	11/14/2005	EXAMINER	
ARTZ & ARTZ, P.C. 28333 TELEGRAPH RD. SUITE 250 SOUTHFIELD, MI 48034			KAO, CHIH CHENG G	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 11/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

4.A

<b>Office Action Summary</b>	Application No. 10/707,284	Applicant(s) PRICE ET AL.	
	Examiner Chih-Cheng Glen Kao	Art Unit 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 October 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4-10 and 12-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-10 and 12-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 September 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Drawings*

1. The drawings were received on 9/21/05. These drawings are acceptable.

### *Claim Objections*

2. Claim 17 is objected to because of the following informality, which appears to be a minor draft error.

In the following format (location of objection; suggestion for correction), the following correction may obviate the objection: (claim 17, lines 4-5, "cavity comprising a target"; replacing "comprising" with - -containing- -).

For purposes of examination, the claim has been treated as such. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 4, 7, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bachmann et al. (US Patent 6625254) in view of Barrett (US Patent 6674838).

4. Regarding claim 1, Bachmann et al. discloses an apparatus comprising a source housing (fig. 8, #21) comprising a non-apertured source window, that separates a source interior from an external cavity, with said source housing and having a first voltage potential (fig. 8, #3), and a source electrode having a second voltage potential (fig. 8, #23) and generating electrons (fig. 8, #24), said source electrode emitting said electrons (fig. 8, #24) through said source window (fig. 8, #3) to a target (fig. 8, in #25) external to said source housing (fig. 8, #21).

However, Bachmann et al. fails to disclose a sealed structure, wherein a source window comprises feedthroughs for a coolant to flow therein and absorb heat from a source window.

Barrett teaches a sealed structure (col. 5, lines 62-67), wherein a source window (fig. 1, #58) comprises feedthroughs (fig. 1, #68) for a coolant (col. 9, line 23) to flow therein and absorb heat from said source window (fig. 1, #58).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Bachmann et al. with the sealing and feedthroughs of Barrett, since one would be motivated to make such a modification to better cool the tube at specific locations compared to indirect cooling systems (col. 3, lines 62-66) for reducing thermal damage and to strengthen x-ray intensity as implied from Barrett.

5. Regarding claim 2, Bachmann et al. as modified above suggests an apparatus as recited above.

However, Bachmann et al. fails to disclose a coolant channel housing thermally coupled to and at least partially defined by a source housing comprising a coolant channel and a coolant flowing therein, said coolant absorbing heat from the source housing.

Barrett teaches a coolant channel housing (fig. 1, #68) thermally coupled (fig. 1, #64) to and at least partially defined by a source housing (fig. 1, #66) comprising a coolant channel (fig. 1, #68) and a coolant flowing (col. 9, line 23) therein, said coolant absorbing heat from the source housing (fig. 1, #64 and 68).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to further incorporate the apparatus of Bachmann et al. with the coolant of Barrett, since one would be motivated to make such a modification to better cool the tube at specific locations compared to indirect cooling systems (col. 3, lines 62-66) as implied from Barrett for reducing thermal damage.

6. Regarding claim 4, Bachmann et al. further discloses wherein said source window (fig. 8, #3) allows direct electron emission (fig. 8, #24) to pass through said source window (fig. 8, #3) to said target (fig. 8, in #25) and prevents indirect electron emission from passing through said source window (fig. 8, #3).

7. Regarding claim 7, Bachmann et al. would necessarily have a variable potential (on and off).

8. Regarding claim 9, Bachmann et al. as modified above suggests an apparatus as recited above.

However, Bachmann et al. does not disclose an electron beam source as a complete and separate sub-assembly of an imaging tube.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to further incorporate the apparatus of Bachmann et al. as modified above with a separate sub-assembly, since constructing a formerly integral structure in various elements involves only routine skill in the art. One would be motivated to make such a modification for cheaper replacement of parts.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bachmann et al. and Barrett as applied to claim 1 above, and further in view of Beland (US Patent 5241260).

Bachmann et al. as modified above suggests an apparatus as recited above.

However, Bachmann et al. fails to disclose a thermionic tungsten wire coil.

Beland teaches a thermionic tungsten wire coil (col. 1, lines 40-41).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Bachmann et al. as modified above with the thermionic tungsten wire coil of Beland, since one would be motivated to make such a modification for greater emission intensity (col. 1, lines 43-46) as implied from Beland, due to tungsten's ability to maintain integrity at high temperatures.

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bachmann et al. and Barrett as applied to claim 1 above, and further in view of Nakamura et al. (US Patent 5517545).

Bachmann et al. as modified above suggests an apparatus as recited above.

However, Bachmann et al. fails to disclose a source electrode as a focusing electrode.

Nakamura et al. teaches a source electrode as a focusing electrode (fig. 5, #15d).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Bachmann et al. as modified above with the focusing electrode of Nakamura et al., since one would be motivated to make such a modification for greater emission intensity (fig. 5) as implied from Nakamura et al.

11. Claims 8 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bachmann et al. and Barrett as applied to claim 1 above, and further in view of Matsushita et al. (US Patent 6526122).

Bachmann et al. as modified above suggests an apparatus as recited above.

However, Nakamura et al. fails to disclose a grid coupled between a source electrode and a target, said grid focusing electrons, and wherein said grid is coupled within a source housing.

Matsushita et al. teaches a grid (fig. 1, #72) coupled between a source electrode (fig. 1, #73) and a target (fig. 1, #32), said grid focusing electrons (col. 1, lines 18-21), and wherein said grid (fig. 1, #72) is coupled within a source housing (fig. 1, housing of #2).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Bachmann et al. as modified above with the focusing grid of Matsushita et al., since one would be motivated to make such a modification to better obtain predetermined x-rays (col. 1, lines 28-31) as implied from Matsushita et al.



Art Unit: 2882

12. Claims 10, 12, 15, 16, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bachmann et al. and Barrett as applied to claim 1 above, and further in view of Yamaguchi (JP 54-151384).

Bachmann et al. as modified above discloses an apparatus as recited above.

However, Bachmann et al. fails to disclose a rotating target having a third voltage potential in a low pressure cavity containing said rotating target for a beam source directed at a glancing angle and a window having a voltage potential that is approximately equal to a voltage potential of a target.

Barrett teaches a rotating target (fig. 1, #106) having a third voltage potential in a low-pressure cavity containing said rotating target for a beam source directed at a glancing angle (fig. 1, #106). Yamaguchi teaches a window (fig. 1, #21) having a voltage potential that is approximately equal to a voltage potential (abstract, constitution) of a target (fig. 1, #17).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Bachmann et al. as modified above with rotating target of Barrett, since one would be motivated to make such a modification for better x-ray emission (fig. 1, from #106) as implied from Barrett.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Bachmann et al. as modified above with the voltage potentials of Yamaguchi, since one would be motivated to make such a modification for reducing discharge for more stable operation (abstract) as implied from Yamaguchi.



Art Unit: 2882

13. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bachmann et al., Barrett, and Yamaguchi as applied to claim 10 above, and further in view of Matsushita et al.

Bachmann et al. as modified above suggests an apparatus as recited above.

However, Bachmann et al. fails to specifically disclose a frame coupled within a tube, a low-pressured cavity fluidically coupled between the frame and a target, said cavity at least partially defined by the frame, target, and sealed electron beam source, and said cavity at least partially exhausted or filled with a low-pressure gas comprising at least one of a low-Z substance, helium, nitrogen, or argon.

Matsushita et al. teaches a frame (fig. 1, #31) coupled within a tube (fig. 1, #1), a low-pressured cavity (fig. 1, cavity inside #31) fluidically coupled between the frame and a target (fig. 1, #32), said cavity at least partially defined by the frame (fig. 1, #31), target (fig. 1, #32), and sealed electron beam source (fig. 1, #50), and said cavity at least partially exhausted (col. 6, lines 8-10) or filled with a low-pressure gas comprising at least one of a low-Z substance, helium, nitrogen, or argon.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Bachmann et al. as modified above with the cavity of Matsushita et al., since one would be motivated to make such a modification to produce a better x-ray beam due to the vacuum.

14. Claims 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bachmann et al. in view of Barrett and Yamamura (US Patent 4188558).

15. Regarding claims 17-19, Bachmann et al. in view of Barrett suggests a method as recited above.

However, Bachmann et al. fails to disclose forming a cavity containing a source and a target and at least partially filling said cavity with a gas.

Yamamura teaches forming a cavity (fig. 1, cavity in #1) containing a source (fig. 1, #6) and a target (fig. 1, #5) and at least partially filling said cavity with a gas (abstract, and col. 1, lines 12-14).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the method of Bachmann et al. as modified above with the pressured gas of Yamamura, since one would be motivated to make such a modification to reduce damage (col. 2, lines 62-64) as shown by Yamamura.

16. Regarding claim 20, Bachmann et al. as modified above suggests a method as recited above.

However, Bachmann et al. fails to disclose utilizing low pressure gas to enhance heat transfer between a target and frame of an imaging tube.

Yamamura further teaches utilizing low-pressure (abstract) gas to enhance heat transfer (col. 1, lines 12-14) between a target (fig. 1, #5) and frame (fig. 1, #1) of an imaging tube.

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to further incorporate the method of Bachmann et al. as modified above

Art Unit: 2882

with the gas pressure of Yamamura, since one would be motivated to make such a modification to reduce damage (col. 2, lines 62-64) as shown by Yamamura.

17. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bachmann et al., Barrett, and Yamaguchi as applied to claim 10 above, and further in view of Koller (US Patent 6438208).

Bachmann et al. as modified above suggests an apparatus as recited above.

However, Bachmann et al. fails to disclose a frame, an x-ray window coupled to said frame, and a coolant channel housing comprising coolant channels coupled to said frame and cooling said x-ray window.

Koller teaches a frame (fig. 1, #104), an x-ray window (fig. 1, #200) coupled to said frame (fig. 1, #104), and a coolant channel housing (fig. 1, #310) comprising coolant channels (fig. 2, #308) coupled to said frame (fig. 1, #104) and cooling said x-ray window (col. 6, lines 15-30).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Bachmann et al. as modified above with the coolant of Koller, since one would be motivated to make such a modification for minimizing thermal stress and strain (col. 2, lines 43-46) as implied from Koller.

18. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bachmann et al., Barrett, Yamaguchi, and Koller as applied to claim 23 above, and further in view of Richardson (US Patent 6529579).

Bachmann et al. as modified above suggests an apparatus as recited above.

However, Bachmann et al. fails to disclose wherein coolant cooling an x-ray window are fluidically coupled to feedthroughs.

Richardson teaches wherein coolant (fig. 2, #302) cooling an x-ray window (fig. 1, #112) are fluidically coupled to feedthroughs (fig. 2, #506).

It would have been obvious, to one having ordinary skill in the art at the time the invention was made, to incorporate the apparatus of Bachmann et al. as modified above with the fluidically coupled coolant of Richardson, since one would be motivated to make such a modification for removing excessive heat more effectively and efficiently (col. 3, lines 35-40) as implied from Richardson.

### ***Response to Arguments***

19. Applicant's arguments with respect to claims 1, 2, 4-10, and 12-24 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chih-Cheng Glen Kao whose telephone number is (571) 272-2492. The examiner can normally be reached on M - F (9 am to 5 pm).

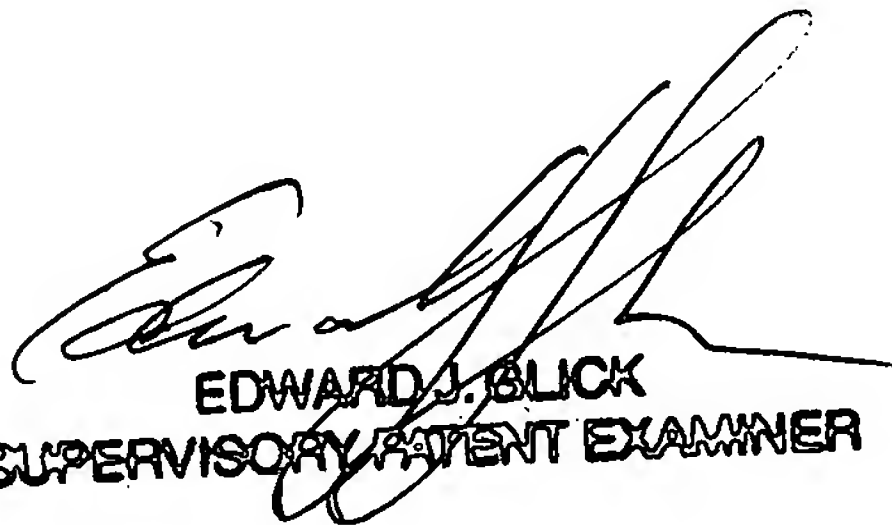
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2882

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

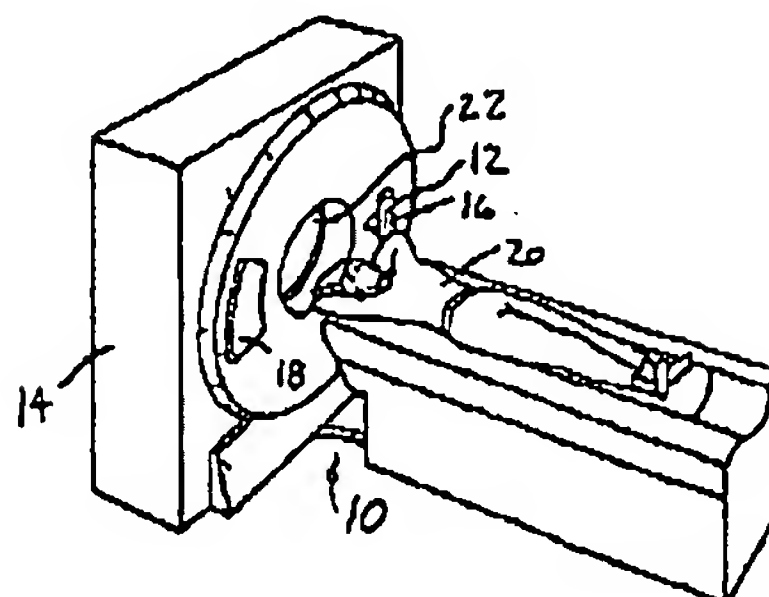


gk

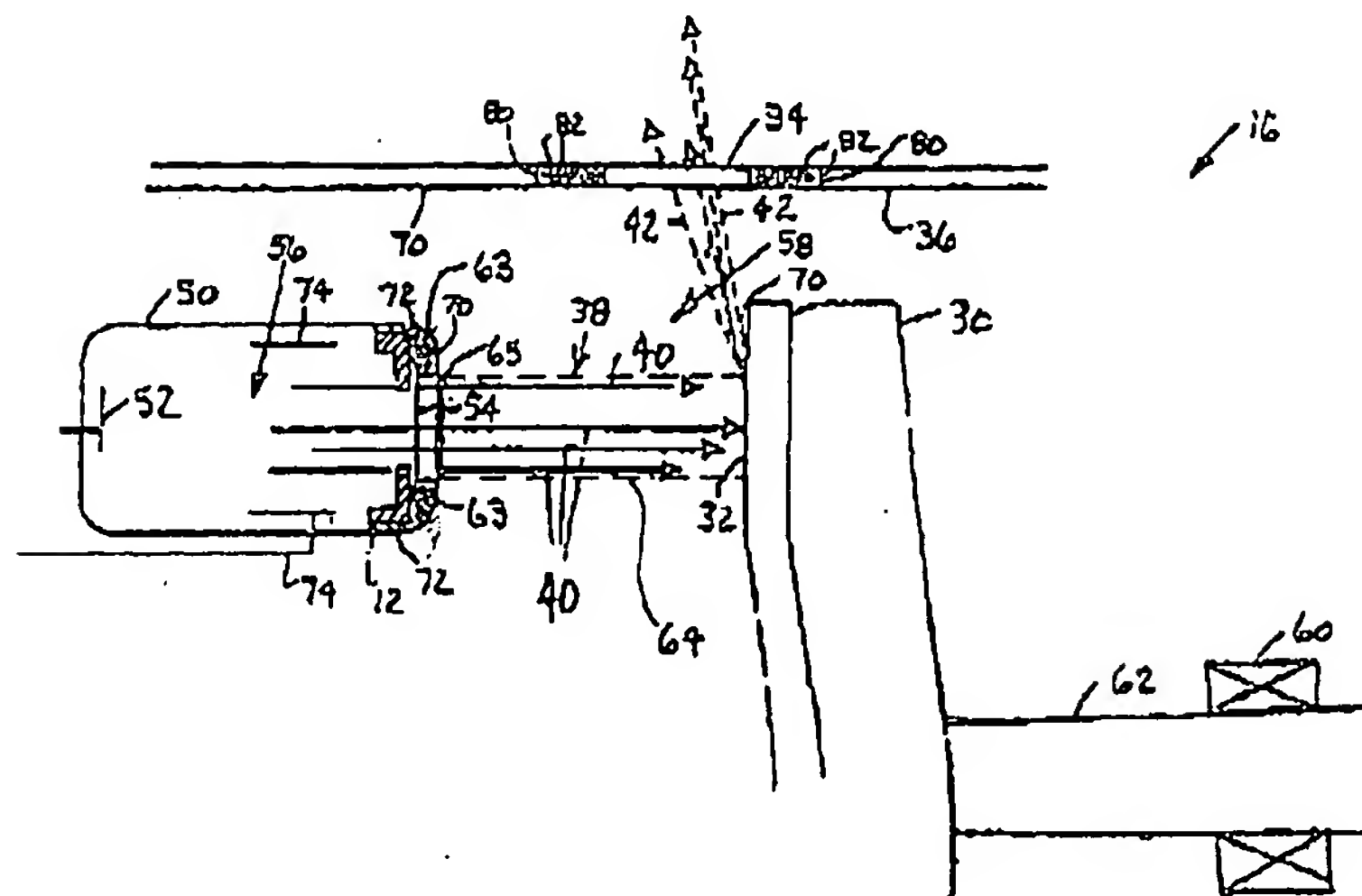


EDWARD J. BLICK  
SUPERVISORY PATENT EXAMINER

## REPLACEMENT SHEET



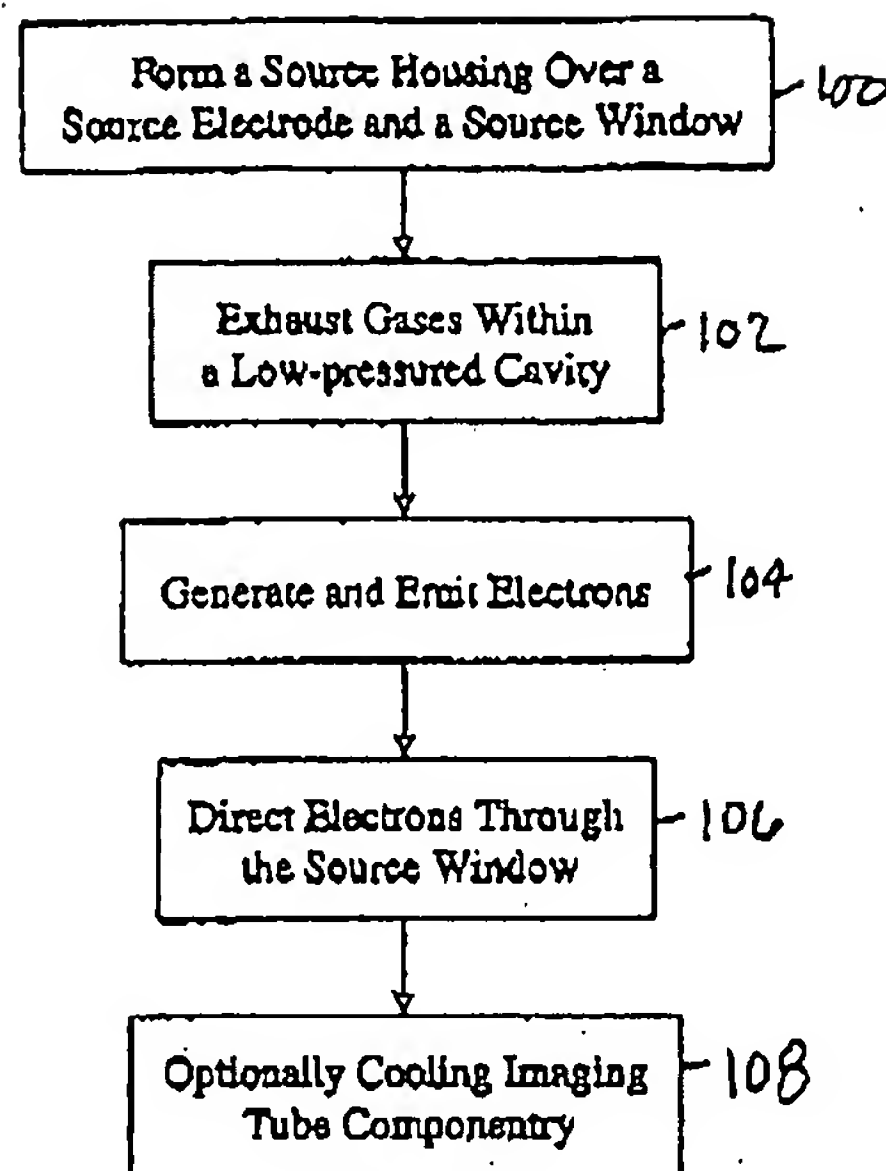
**Fig. 1**



**Fig. 2**

Approved  
  
 11/3/05

## REPLACEMENT SHEET

Fig. 3

Approved  
11/3/05